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| EXAMINER EMPIE, NATHAN H | | | | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/585,099

Applicant(s)

ENDRES ET AL.

Examiner

NATHAN H. EMPIE

Art Unit

1792

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 July 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-43 is/are pending in the application.
- 4a) Of the above claim(s) 11-29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 30-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/CDC)
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date 2/5/07

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of claims 30-43 in the reply filed on 7/8/09 is acknowledged. The traversal is on the ground(s) that "there is no serious burden" and "a search for the invention of Group II should cover many of the area relevant for the invention of Group I. Thus, the search burden would not be serious". This is not found persuasive because a serious burden exists in the differing issues likely to arise during the prosecution of the different inventions.

The requirement is still deemed proper and is therefore made FINAL.

Claims 11-29 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction requirement in the reply filed on 7/8/09.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 30-43 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 30 contains the term "deformable" which is a relative term which renders the claim indefinite. The term "deformable" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary

skill in the art would not be reasonably apprised of the scope of the invention. For purposes of examination, the term "deformable" is being interpreted as "capable having its shape altered by pressure or stress".

The other dependent claims do not cure the defects of the claims from which they depend.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 30-32, 35-37, and 39-43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mennig et al (US patent 6,162,498 as supplied in applicant's IDS dated 2/5/07; hereafter Mennig) in view of Hench et al. (US patent 4,851,150; hereafter Hench).

Claim 30: Mennig teaches a process for making a metallic substrate having a vitreous coating (see, for example, abstract), wherein the process comprises;

(a) applying an alkali metal silicate-containing coating sol to the substrate to provide a coating layer on the substrate (see for example, abstract, and col 6 lines 14-56);

and (b) thermally densifying the coating layer of (a) by a two-stage heat treatment comprising, in a first stage, a heat treatment (see, for example, drying at a temperature up to 100°C, col 4 lines 13-20) and, in a second stage, a heat treatment in

a low-oxygen atmosphere up to full densification with formation of a vitreous layer (see, for example, col 4 lines 20-27, and abstract).

Mennig teaches wherein a first heat stage (drying) can be conducted by a conventional drying operation at temperatures of about 100°C (See, for example, col 4 lines 13-20). But Mennig is silent as to specific conventional drying conditions, so Mennig does not explicitly teach wherein the drying process is conducted in an oxygen-containing environment. Hench teaches a method of forming sol-gel derived silicon containing articles (See, for example, abstract). Furthermore Hench explicitly teaches that it is well known in the art to predictably dry such sol-gel derived silicon containing articles in oxygen-containing atmosphere (air) (see, for example, col 9 lines 21-24). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to have incorporated drying in air into the method of Mennig since Mennig is silent as to the specifics of conventional drying and when a primary reference is silent as to a certain detail, one of ordinary skill would be motivated to consult a secondary reference which satisfies the deficiencies of the primary reference, and such secondary reference, Hench, has taught the specific conditions of just such a conventional drying process to predictably dry a sol-gel derived silicon containing article.

With regards to the limitation directed to the vitreous coating's ability to be altered by stress or pressure, the examiner asserts that inherently at sufficient pressures and / or stresses any material's shape can be altered. Further, where the claimed and prior art products are identical or substantially identical in structure or composition, or are

produced by identical or substantially identical processes, a *prima facie* case of obviousness has been established, *In re Best*, 195 USPQ 430, 433 (CCPA 1977).

Claim 31: Mennig further teaches wherein the heat treatment of the first stage is carried out according to alternative (A) at an end temperature of up to about 100°C (see for example, col 4 lines 1-20).

Claim 32: Hench further teaches wherein the oxygen-containing atmosphere comprises about 20% by volume of oxygen (air) (see, for example col 9 lines 21-24).

Claim 35: Mennig further teaches wherein the heat treatment of the second stage is carried out at an end temperature of 500°C (see, for example, col 6 lines 42-45).

Claim 36: Mennig in view of Hench teaches the method of claim 35 (described above), and Mennig further teaches wherein the second stage of heat treatment is carried out at an end temperature based on the heat resistance of the underlying metallic surface, and preferably at a temperature of least 500°C in an oxygen-free atmosphere (see, for example, col 4 lines 20 - 27). Although Mennig in view of Hench does not explicitly teach wherein the end temperature of the second stage is in the range from 540°C to 560°C it would have been obvious to one of ordinary skill in the art at the time of invention to have incorporated such an end temperature range since in the case where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976).

Claim 37: Mennig further teaches wherein the heat treatment of the second stage is carried out in an inert gas atmosphere (see, for example, nitrogen or argon, col 4 lines 25-27).

Claim 39: Mennig further teaches wherein the alkali metal silicate-containing coating sol is obtainable by a process comprising a hydrolysis and polycondensation of one or more silanes of formula R_nSiX_{4-n} wherein the radicals X independently represent hydrolyzable groups or hydroxyl groups, the radicals R independently represent hydrogen, alkyl, alkenyl and alkynyl groups having up to 4 carbon atoms and aryl, aralkyl and alkaryl groups having from 6 to 10 carbon atoms, and n is 0, 1 or 2, with the proviso that at least one silane where n=1 or 2 is used, or oligomers derived therefrom, in the presence of (a) at least one compound selected from oxides and hydroxides of alkali metals and alkaline earth metals, and (b) optionally, nonsocial SiO_2 particles (see, for example, abstract, and col 2 lines 58 – 66 wherein preferably up to 4 carbon atoms is taught).

Claims 40-41: Mennig further teaches wherein the at least one compound is used in such an amount that an atomic ratio Si : (alkali metal and/or alkaline earth metal) is in a range of from 15:1 to 10:1 (see, for example, col 3 lines 39-45).

Claims 42-43: Mennig further teaches wherein an average value of n in the silanes of formula (I) is from 0.5 to 1.0 (see, for example, col 2 lines 41-48).

Claims 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mennig in view of Hench as applied to claim 30 above, and further in view of the content

from <http://web.archive.org/web/20020427181641/http://www.Mcgillairpressure.com/vac/textdocs/aboutus.html> (dated by the Internet Archive Wayback Machine as available on 4/27/02; hereafter McGill).

Claim 33-34: Mennig in view of Hench teach the method of claim 30 (described above), wherein Mennig further teaches a first heat stage (drying) can be conducted by a conventional drying operation at temperatures of about 100°C (See, for example, col 4 lines 13-20). But Mennig is silent as to specific conventional drying conditions, so Mennig does not explicitly teach wherein the drying process is conducted in vacuum at a residual pressure of ≤ 15 mbar, and further ≤ 5 mbar. McGill teaches that vacuum drying is conventional in the art and further provides benefits over atmospheric drying resulting in faster drying, more efficient heat recovery, drying at lower temperatures, reducing energy costs and contaminants, etc. (see whole article). Hench teaches a method of forming sol-gel derived silicon containing articles (See, for example, abstract). Furthermore Hench explicitly teaches that it is well known in the art and preferable to predictably dry such sol-gel derived silicon containing articles under a reduced atmosphere of approximately 1 Torr vacuum (~ 1.33 mbar) (see, for example, col 9 lines 21-24). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to have incorporated vacuum drying at 1 Torr (~ 1.33 mbar) into the method of Mennig since Mennig is silent as to the specifics of conventional drying and when a primary reference is silent as to a certain detail, one of ordinary skill would be motivated to consult a secondary reference which satisfies the deficiencies of the primary reference, and such secondary references of McGill and Hench have taught

that vacuum drying provides benefits over atmospheric drying, and has taught the specific conditions of just such a conventional drying process to predictably dry a sol-gel derived silicon containing article.

Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mennig and Hench as applied to claim 30 above, and further in view of Chou et al ("Sol-Gel-Derived Hybrid Coatings for Corrosion Protection" in J. Sol-Gel Sci. and Tech. 26, pg 321-327, 2003).

Claim 38: Mennig in view of Hench teaches the method of claim 30 (described above); wherein Mennig further teaches sol-gel derived silicon based coatings are used to protect steel surfaces (see, for example, col 1 lines 1 - 58, and col 6 lines 35-57). Mennig further has taught a method of preparing such coatings wherein the densification of such coatings is important (see, for example, col 6 lines 35-57), but is silent as to the specific cooling conditions for the coating process, so Mennig and Hench does not explicitly teach the process further comprises cooling the heat-treated substrate at a cooling rate of from 1 to 10 K/min. Chou teaches a method of forming sol-gel derived silicon based coatings intended to protect steel surfaces (see, for example, abstract). Chou has further taught wherein the cooling rate will influence densification, and wherein a suitable cooling rate to predictably densify a sol-gel derived silicon based coatings on a steel surface is a rate of 5°C / min (5 K/min) (see, for example, pg 323). When a primary reference is silent as to a certain detail, one of ordinary skill would be motivated to consult a secondary reference which satisfies the

deficiencies of the primary reference; both Mennig in view of Hench and Chou teach method of forming sol gel derived silicon based coatings intended to protect steel surfaces, it would have been obvious to one of ordinary skill in the art at the time of invention to have incorporated a cooling rate of 5K/min in order to achieve the predictable result of forming a dense sol-gel derived protective silica coating on a steel surface.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NATHAN H. EMPIE whose telephone number is (571)270-1886. The examiner can normally be reached on M-F, 7:00- 4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on (571) 272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/N. H. E./
Examiner, Art Unit 1792

/Katherine A. Bareford/
Primary Examiner, Art Unit 1792